

in claims 36-39, is clearly not made obvious by the combination of Balch and Haff under 103.

Briefly, an important feature of our invention is the combination of (1) having a plurality of capillaries with end openings of a diameter which prevents biomolecules from being pulled down by gravity in a non-depositing condition, (2) means for applying voltage between the plurality of capillaries and the substrate during the depositing condition to cause the biomolecules to be deposited in a controlled manner by force of gravity on the substrate, and (3) stopping the application of voltage so that the biomolecules are again held within the capillaries by the surface tension at the openings being greater than the force of gravity during the non-depositing condition.

Clearly, these combined features are not taught by nor made obvious by the combined references Balch and Haff.

Haff clearly does not control application of electric field to enable the biomolecules to fall down through the openings during the depositing condition and does not have end openings of a diameter which prevents biomolecules from falling down during the non-depositing condition.

Moreover, Balch clearly does not apply electric field to enable biomolecules to fall down through the openings during the depositing state and does not teach end openings of a diameter to otherwise hold the biomolecules in the capillaries during the non-depositing state when no electric is applied.

This type of new controlled use of electric combined with

the controlled diameter size of the end openings to enable reliable and uniform deposits of biomolecules on a substrate is completely novel in the art, insofar as we are aware. Both Haff and Balch use pressure to control the flow and stop the flow of biomolecules through a capillary. In addition, Balch suggests "electro-osmosis and electrophoresis" to facilitate flow after the capillary is blown free (called "priming" by Balch) by pressure. (See col. 15, lines 44-52 of Balch). BUT, nowhere is the inventive concept of use of the combination of controlled use of electric field and controlled size of diameter of the end openings to selectively control the deposit of biomolecules onto a substrate at reliable and uniform rates shown in the prior art. This concept is clearly novel and patentable.

The Examiner alleges that Balch teaches use of "electro-osmosis or electrophoresis" and points to col. 15, lines 44-52, and claims 15 (directed to pressure and hence not relevant) 18 and 19.

However, careful reading of that portion of the Balch disclosure as well as the entire patent, shows that the foregoing is not the same as nor even close to applicant's recited teachings, as discussed above. Balch does not specify use of the electric field combined with the controlling of the size of the end opening thereby to control the deposit of biomolecules in the manner above discussed for the applicant's recited invention.

Furthermore, Balch states "After priming (which is done by use of pressure) continuous flow of the probe solution through the

capillaries is thereafter facilitated.... by electro-osmotic or electro-phertic force (where the tubes, storage vessels, and reaction chamber are appropriately modified to maintain and modulate an electro-osmotic and/or electrophoretic potential)..."

Thus, clearly, Balch does not teach nor suggest nor even contemplate any use of the surface tension at the capillary opening and to stop the flow in a non-deposit condition, combined with the use of electric to cause deposit against the surface tension force during the depositing condition, as does applicant.

Clearly, the instant features are completely different from any combination of Balch and Haff, and clearly, no extension of the cited references in combination would make obvious the instant invention.

In view of the foregoing, reconsideration and allowance are respectfully solicited.

respectfully
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